

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Perry Scott Lorenz

Application No.: 10/774,799

Confirmation No.: 9070

Filed: February 9, 2004

Art Unit: 2816

For: APPARATUS AND METHOD FOR
POWERING UP WITH HYSTERESIS
INACTIVE

Examiner: K. E. Almo

DECLARATION OF PERRY SCOTT LORENZ

UNDER 37 C.F.R. § 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

I, Perry Scott Lorenz, declare as follows:

1. I am a design engineer for National Semiconductor Corporation.
2. I have been employed with National Semiconductor Corporation since 1988 February 29.
3. I have a BS in Electrical Engineering from the University of Wisconsin.
4. I have over 33 years of experience in the field of analog circuit design. I have a high degree of familiarity with analog circuit design.
5. I am an inventor for the above-referenced application.
6. National Semiconductor Corporation is the assignee for all of my rights in the above-referenced application.

7. I have reviewed U.S. Patent 6,163,183 (hereinafter referred to as Azimi), and U.S. Patent 5,614,857 (hereinafter referred to as Lim).

In my expert opinion, based on my thorough review of the Azimi reference, the following statements (8-16) are true:

8. A bandgap voltage reference, such as a bandgap voltage reference 22 in Azimi, is a voltage reference circuit that provides a constant, stable output voltage that is close to the theoretical bandgap voltage of silicon at 0° K. The voltage provided by a bandgap voltage reference is substantially independent of temperature. For example, an uncompensated, relatively poorly performing bandgap voltage reference might vary between 1.240 Volts to 1.250 Volts over a temperature range of -55 degrees Celsius to 125 degrees Celsius. Modern bandgap reference designs often attempt to minimize temperature dependence as much as possible, so that lower temperature variance is achieved.

9. The output voltage of a bandgap voltage reference is not proportional to absolute temperature, nor does Azimi claim that it is.

10. The relationship between voltage and temperature of a bandgap reference voltage is a curve rather than a straight line, so that a bandgap reference voltage is typically at a given voltage level at more than one temperature. For this reason, it typically would be impossible to determine the temperature from simply knowing the bandgap reference voltage alone. This is yet another reason why a bandgap reference voltage could not reasonably be used as a temperature sensor signal, beyond the fact that the variance based on temperature is so small. Since a bandgap reference voltage is at a given voltage level at more than one temperature, the bandgap reference voltage is not indicative of a particular temperature.

11. An analog circuit engineer of reasonable competence could not reasonably construe the voltage at node 24 in Azimi, output by bandgap reference voltage 22, as a temperature sensor signal, even when the term "temperature sensor signal" is construed as broadly as possible to one ordinary competence in the field of analog circuit design.

13. The circuit of Azimi does not activate hysteresis based on whether a temperature sensing condition of any type has occurred.

14. The circuit of Azimi does not ensure that hysteresis is automatically inactive when the circuit of Azimi is powering up. Instead, the circuit of Azimi uses hysteresis to prevent multiple resets.

15. The comparator 27 of Azimi does not trip based on the temperature reaching a predetermined level. Furthermore, the comparison performed by comparator 27 of Azimi could not reasonably be construed as a temperature comparison. Rather, the comparison performed by comparator 27 monitors an undervoltage condition of the monitored voltage V_{MONITOR} , which is a battery voltage or the like. If the battery voltage falls below a predetermined level, the comparator 27 will trip. The comparison therefore is a comparison of the battery voltage to a reference level, and not a temperature comparison, and comparator 27 does not trip based on the temperature reaching a predetermined level. The temperature could remain constant throughout the entire operation of the circuit of Azimi, and comparator 27 would still trip. A comparator that trips despite the temperature remaining constant throughout its operation could not reasonably be considered to be a temperature comparison under the broadest definition of the term "temperature comparison" that would be considered reasonable to an engineer of ordinary competence in the field of analog circuit design.

16. The circuit of Azimi does not provide temperature hysteresis, let alone 2 degrees to 10 degrees Celsius of temperature hysteresis. It would be nonsensical to modify the circuit of Azimi to provide temperature hysteresis in a range of about two degrees Celsius to 10 degrees Celsius. The temperature could remain constant throughout the entire operation of the circuit of Azimi, and comparator 27 would still trip. Accordingly, providing 2 degrees to 10 degrees Celsius of temperature hysteresis is not applicable to the circuit of Azimi.

In my expert opinion, based on my thorough review of the Lim reference, the following statements (17-22) are true:

17. Voltage V_{in2} of Lin is not a temperature sensor signal. The Office Action theorizes that "the temperature of R11 increases as the current through it increases thereby providing a higher voltage V_{in2} ". Actually, V_{in2} increases because it is following V_{in1} but it is delayed by the RC circuit. This is true even if the resistor temperature were forced to be lower by the external environment. The relationship between resistance and temperature depends on the temperature

coefficient of the resistor. The temperature coefficient of a resistor can be positive, negative, or even zero. Nowhere does the Lim reference mention resistor temperature coefficient, nor does Lim point out whether the temperature coefficient of any of the resistors is positive, negative, or zero. Accordingly, it cannot be determined whether the voltage increases, decreases, or remains the same with an increase in temperature.

18. The circuit of Lim has no power on reset (POR) signal at all. The term "power on reset signal" has a specific meaning to an engineer of ordinary competence in the field of analog circuit design, and is not arbitrary in meaning. To refer to any arbitrary signal as a "power on reset" signal would not be considered reasonable to an engineer of ordinary competence in the field of analog circuit design.

19. The circuit of Lim does not ensure that hysteresis is automatically inactive when the circuit is powering up. To an engineer of ordinary competence in the field of analog circuit design, "power up" or "when the circuit is powering up" is not an arbitrary term, and has a specific meaning and occurs at a specific time, rather than any arbitrarily designated time. To refer to "power up" as occurring at any arbitrarily designated time would not be considered reasonable to an engineer of ordinary competence in the field of analog circuit design.

20. The circuit of Lim does not activate hysteresis based on whether a temperature sensing condition of any type has occurred.

21. The circuit of Lim does not provide temperature hysteresis, let alone 2 degrees to 10 degrees Celsius of temperature hysteresis. It would be nonsensical to modify the circuit of Lim to provide temperature hysteresis in a range of about two degrees Celsius to 10 degrees Celsius. The temperature could remain constant throughout the entire operation of the circuit of Lim, and comparator OP20 would still trip. Accordingly, providing 2 degrees to 10 degrees Celsius of temperature hysteresis is not applicable to the circuit of Lim.

22. In the circuit of Lim, the comparator OP20 tripping is not based on a temperature comparison, and is not based on the temperature reaching a predetermined level, but is instead based on whether Vin1 is high or low and on the hysteresis operation as illustrated in FIG. 5A-5E. The temperature could remain constant throughout the entire operation of the circuit of Lim, and comparator OP20 would still trip. A comparator that trips despite the temperature remaining

constant throughout its operation could not reasonably be considered to be a temperature comparison under the broadest definition of the term "temperature comparison" that would be considered reasonable to an engineer of ordinary competence in the field of analog circuit design.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

Dated: 2009-9-10
September 10

By Perry Scott Lorenz
Perry Scott Lorenz